IN THE CLAIMS

1. (original) A pump comprising:

a stator;

~~at least one~~ a rotor mounted within a housing, the housing comprising a first fluid channel extending about the rotor, the rotor comprising ~~at least one~~ a second fluid channel;

a first sensor configured to output a signal indicative of the temperature of the stator;

a second sensor configured to output a signal indicative of the temperature of the rotor; and

thermal control means for controlling the temperature of fluid, when present, in said channels depending on the magnitude of signals output from the first sensor and the second sensors.

2. (currently amended) The~~A~~ pump according to claim 1, wherein the first ~~temperature~~ sensor is located at the stator.

3. (currently amended) The~~A~~ pump according to ~~claim 1 or~~ claim 2, wherein the second ~~temperature~~ sensor is located in ~~the~~ a gear box.

4. (currently amended) ~~A~~ The pump according to ~~claim 1 or~~ claim 2, wherein the second ~~temperature~~ sensor is located in the housing, in fluid contact ~~, in use,~~ with a process gas in an exhaust portion of the rotor.

5. (currently amended) The~~A~~ pump according to ~~any preceding~~ claim 1, wherein the thermal control means comprises:

first control means for controlling the temperature of fluid in the first fluid channel; and

second control means for controlling the temperature of fluid in ~~said at least one~~ the second fluid channel.

6. (currently amended) The~~A~~ pump according to claim 5, wherein the first control means comprises:

a ~~at least one~~ flow pump;
a ~~at least one~~ control valve; and
a ~~at least one~~ heat exchanger.

7. (currently amended) The~~A~~ pump according to ~~claim 5 or~~ claim 6, wherein the first control means is arranged to control the temperature of fluid in the first fluid channel depending on the magnitude of a signal output from the first sensor.

8. (currently amended) The~~A~~ pump according to ~~any of~~ claims ~~5 to~~ 7, wherein the second control means comprises:

a ~~at least one~~ flow pump;
a ~~at least one~~ control valve; and
a ~~at least one~~ heat exchanger.

9. (currently amended) The~~A~~ pump according to ~~any of~~ claims ~~5 to~~ 8, wherein the second control means is arranged to control the temperature of fluid in the ~~at least one~~ second fluid channel depending on the magnitude of a signal output from ~~at least~~ the second sensor.

10. (currently amended) ~~A~~ The pump according to ~~any of~~ claims ~~5 to 9~~ 8, wherein the second control means is arranged to control the temperature of fluid in the ~~at least one~~ second fluid channel depending on the magnitude of signals output from the second sensor and an additional sensor configured to output a signal indicative of the temperature of the stator.

11. (currently amended) ~~A~~ The pump according to ~~any of~~ claims ~~5 to 9~~ 8, wherein the second control means is arranged to control the temperature of fluid in the ~~at least one~~ second fluid channel depending on the magnitude of signals output from the first sensor and second sensors.

12. (currently amended) The~~A~~ pump according to ~~any of~~ claims 5 ~~to 11~~, further comprising a microprocessor for controlling at least one of the first control means and the second control means.

13. (cancelled)

14. (currently amended) The~~A~~ pump according to claim 12~~ or claim 13,~~ further comprising a third sensor configured to output to the microprocessor a signal indicative of ~~one of the group of~~ pressure ~~and power consumption of the pump~~, wherein the microprocessor is arranged to control at least the second control means depending on the magnitude of that signal.

15. (currently amended) The~~A~~ pump according to ~~any of~~ claims 9 ~~to 12 when dependent from claim 8~~, wherein ~~said at least one~~ the control valve of the second control means comprises a mechanical differential temperature valve.

16. (currently amended) The~~A~~ pump according to claim 15, wherein the mechanical differential temperature valve comprises a third fluid channel in thermal communication with the ~~at least one~~ second fluid channel;

a flow restrictor moveable within the third fluid channel to control the rate of flow of a fluid therethrough; and

two signal receptors for receiving signals from the first and second sensors respectively and controlling the position of the flow restrictor within the third fluid channel depending on the magnitude of the signals received from the first and second sensors.

17. (currently amended) The~~A~~ pump according to claim 16, wherein ~~each~~ at least one of the two signal receptors comprises a sealed component, a volume of each component expanding~~, in use~~, depending upon the magnitude of the signal received, thereby to control the relative position of the restrictor within the third fluid channel.

18. (currently amended) The~~A~~ pump according to claim 17, wherein ~~each~~ at least one of the two signal receptors comprises an expandable bellows.

19. (currently amended) The~~A~~ pump according to ~~any of~~ claims 16~~ to 18~~, wherein the flow restrictor comprises:

a spindle; and

a seat, the spindle acting cooperatively with the seat to open and close an aperture to control the flow of fluid therethrough~~, in use~~.

20. (currently amended) The~~A~~ pump according to ~~any preceding~~ claim 1, wherein the pump is ~~one of the group of~~ a screw pump~~, a claw pump and a Roots pump~~.

21. (currently amended) The~~A~~ pump according to ~~any preceding~~ claim 1, wherein the housing comprises an inner skin and an outer skin, a first cavity being formed by the inner skin, the rotor being mounted ~~therein~~ within the first cavity, the first fluid channel being formed between the inner skin and the outer skins ~~of the housing~~ and extending the length of, and encircling, the rotor.

22. (currently amended) ~~A~~ The pump according to claim 21, wherein the inner skin of the housing ~~provides~~ adapted to form the stator~~, in use~~.

23. (original) A double-ended pump comprising:

~~at least one~~ a rotor~~,~~ comprising one inlet portion and two exhaust portions;

a stator; and

a housing~~, the housing~~ comprising an inner skin and an outer skin, a first cavity being formed by the inner skin, the rotor being mounted ~~therein~~ within the first cavity and a second cavity being formed between the inner skin and outer skins of the housing ~~through which~~ for circulating a fluid ~~is circulated, in use~~, wherein the second cavity extends the length of and encircles the rotor.

24. (cancelled)

25. (currently amended) A method for releasing the rotors of a pump that have seized due to the presence of deposits of a substance which has formed on the internal working surfaces of the pump on cooling, comprising the steps of:

introducing a thermal fluid into a cavity provided within the housing of the pump, the cavity encircling the rotor components;

heating the thermal fluid in the cavity to a predetermined temperature~~, this temperature being sufficiently high~~ to cause the deposits to be softened; and

applying torque to the rotors of the pump to overcome any remaining impeding force caused by the deposits located on the internal working surfaces of the pump.

26. (currently amended) A method for controlling a clearance between a rotor and stator within a pump ~~according to any of claims 1 to 22,~~ the method comprising the steps of:

(a) measuring the temperature of the stator with a first sensor and measuring the temperature of the rotor with a second sensor;

(b) recording the temperature of ~~each of~~ the stator and the temperature of the rotor using ~~the~~ signals output from the sensors;

~~(b)~~ (c) ~~calculating~~ determining the temperature difference between the stator and the rotor;

~~(c)~~ (d) comparing the determined temperature difference with a predetermined value;

~~(d)~~ (e) achieving a ~~determining suitable values of flow rate and temperature for the fluid in the first and second fluid channels to achieve a~~ predetermined temperature difference between the rotor and the stator by selecting suitable values of flow rate and temperature for fluid in a first fluid channel and a second fluid channel; and

~~(e)~~ (f) controlling the thermal control means to ~~realise~~ achieve the suitable values ~~from step (d)~~.

27. (original) A method according to claim 26, wherein the method steps are automatically repeated at predetermined time intervals to manage perturbations in the configuration of the pump over time.

28. (currently amended) A method according to claim 26 ~~or claim 27~~, wherein the predetermined temperature difference is modified at predetermined time intervals to cause the clearance between components to be altered such that cumulative deposits can be dislodged from the surfaces of the components of the pump.

29. (cancelled)

30. (cancelled)

31. (cancelled)

32. (new) The pump according to claim 5, wherein the second control means is arranged to control the temperature of fluid in the a second fluid channel depending on the magnitude of the signal from the second sensor.

33. (new) The pump according to claim 5, wherein the second control means is arranged to control the temperature of fluid in the second fluid channel depending on the magnitude of signals output from the second sensor and a third sensor configured to output a signal indicative of the temperature of the stator.

34. (new) The pump according to claim 5, wherein the second control means is arranged to control the temperature of fluid in the second fluid channel depending on the magnitude of signals output from the first and second sensors.

35. (new) The pump according to claim 1, wherein the pump is a claw pump.

36. (new) The pump according to claim 1, wherein the pump is a Roots pump.

37. (new) The pump according to claim 12 further comprising a fourth sensor configured to output to the microprocessor a signal indicative of power consumption of the pump, wherein the microprocessor is arranged to control at least the second control means depending on the magnitude of that signal.